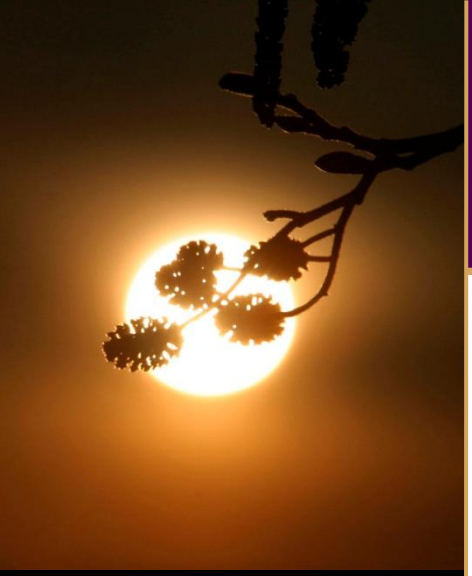


NDCEE

National Defense Center for Energy and Environment

DoD Executive Agent

Office of the Assistant Secretary of the Army (Installations and Environment)

Implementation of Technologies that Promote Army Adoption of WD-CARC

(and other low VOC/zero-HAP CARC)
Joint Services Environmental Management (JSEM) Training Conference and Exposition

Mr. Robert J. Fisher, P.E., NDCEE/*CTC*

The NDCEE is operated by: CTC *Concurrent Technologies Corporation*

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
MAY 2008		**00-00-2008 to 00-00-2008**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Implementation of Technologies that Promote Army Adoption of WD-CARC	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **National Defense Center for Energy and Environment (NDCEE),Concurrent Technologies Corporation,100 CTC Drive,Johnstown,PA,15904**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**27**	

Presentation Agenda

- Objectives
- Background Information
- Technologies
- Demonstrations
- Estimated Implementation Costs
- Path Forward
- Summary

Objectives

- Identify challenges to incorporate new CARC and evaluate technologies and/or training available to meet those challenges
- Conduct demonstrations at selected sites to aid in the transition to one of the new CARC formulations at that site
- Collect data to develop a business case analysis recommending Army-wide use of new CARC formulations

Background

Regulatory Drivers

- The proposed U.S. Environmental Protection Agency's (EPA) Defense Land Systems and Miscellaneous Equipment (DLSME) National Emission Standard for Hazardous Air Pollutants (NESHAP) will regulate hazardous air pollutants (HAPs) from surface coating operations
- In preparation for the DLSME NESHAP, Chemical Agent Resistant Coatings (CARC) are being implemented with low volatile organic compound (VOC) content and no HAPs

Comparison of CARC Formulations

Conventional CARC

- **MIL-DTL-53039B, Type I**
  - Single component
  - Solvent-based

Uses silica-based flattening agents and contains HAPs and about 3.5 pounds of VOCs per gallon

Expected to be phased out in 2009

New CARC

- **MIL-DTL-64159, Type II**
  - Plural component
  - Water-dispersible
- **MIL-DTL-53039B, Type II**
  - Single component
  - Solvent-based

Both use polymeric bead flattening agents, have zero HAPs, and contain less than 1.8 pounds of VOCs per gallon

Benefits of New CARC Formulations

- Zero HAPs
- Lower VOC content
- Better durability, longer coating service life
- Can be a drop-in replacement for old CARC
- Water used for clean-up of MIL-DTL-64159, Type II
- New CARC wastes may be considered non-hazardous (depending on segregation methods)
- Potential for reduced material, clean-up, waste disposal, and life-cycle costs

Challenges to Implementation

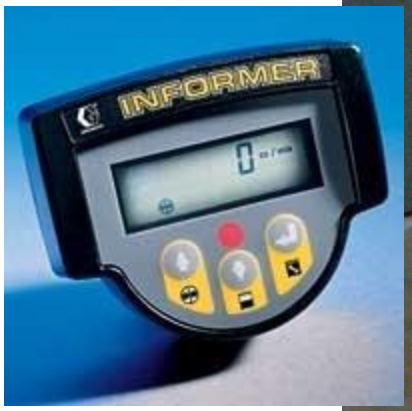
- Longer drying times for water-dispersible
- Additional mixing needed for water-dispersible
- Potential to reduce production rate
- Increased attention to surface preparation
- New spray equipment may be needed
- May experience limited availability/color selection

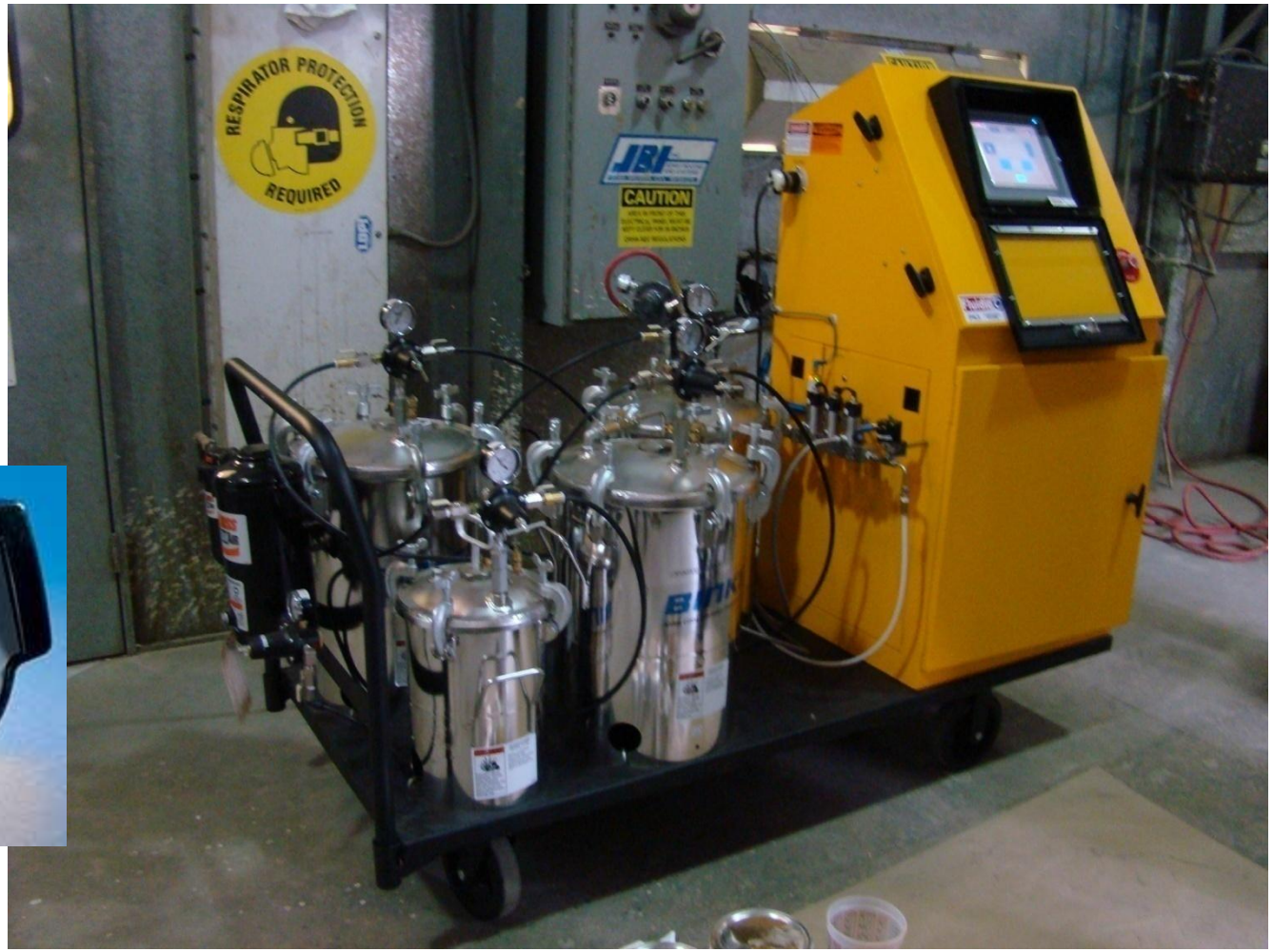
Technologies

Selection of Potential Solutions

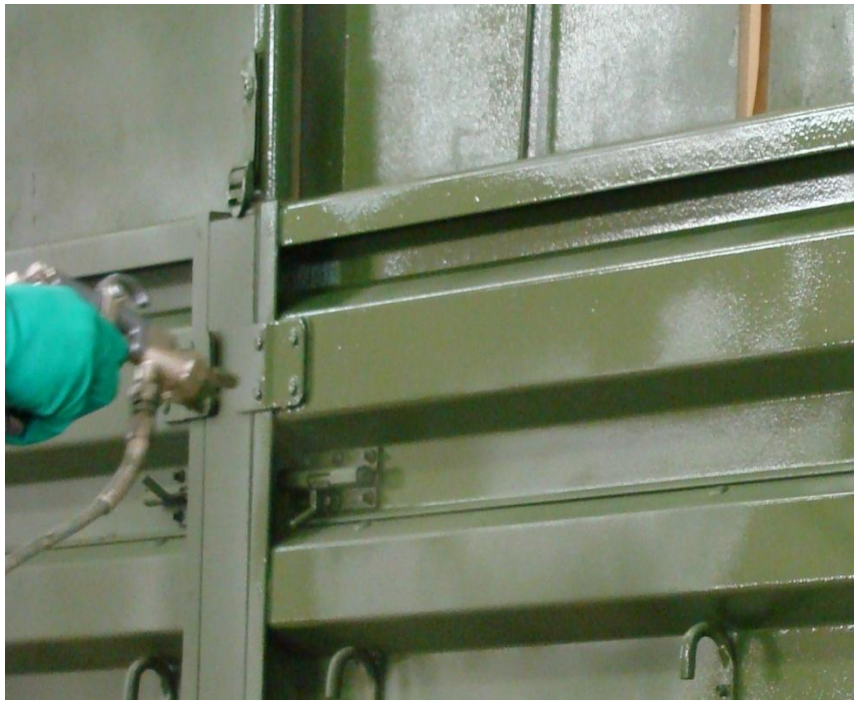
- Choose technologies based upon site-specific conditions
  - Production rate
  - Final appearance
  - Regulatory issues
- Accommodate drying times through more efficient scheduling or expanded drying areas
  - MIL-DTL-64159, Type II may require additional drying time
  - Covered areas outside booth may meet needs
  - Drying technologies are being evaluated

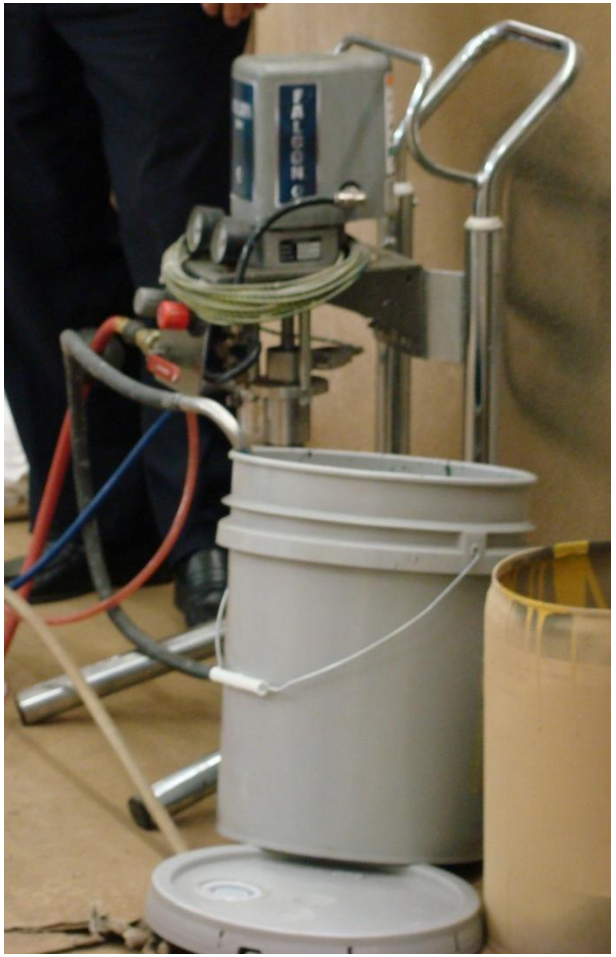
Metering and Mixing





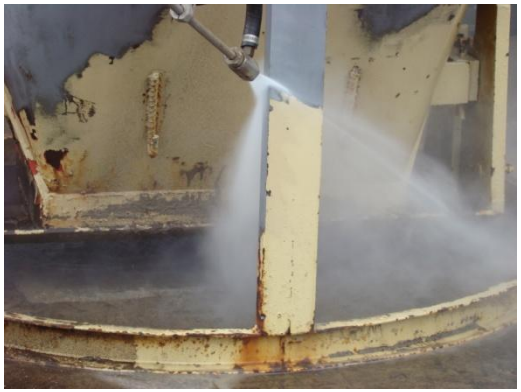
Application

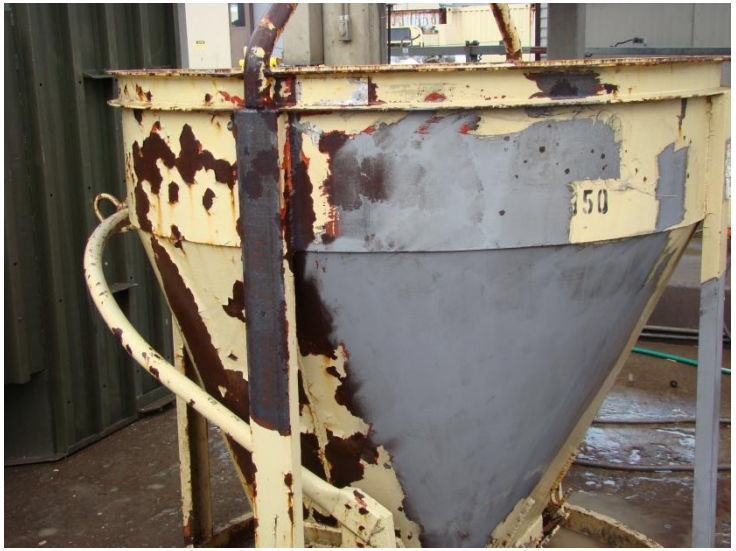


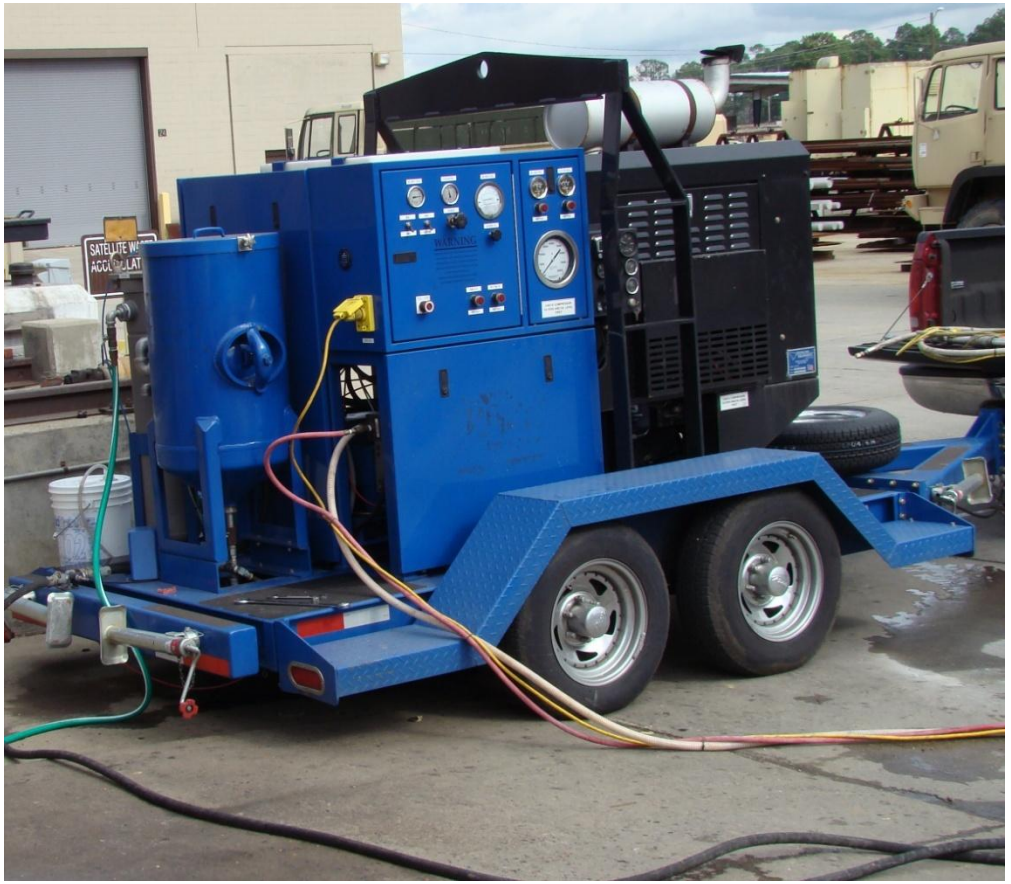


Ancillary Technologies

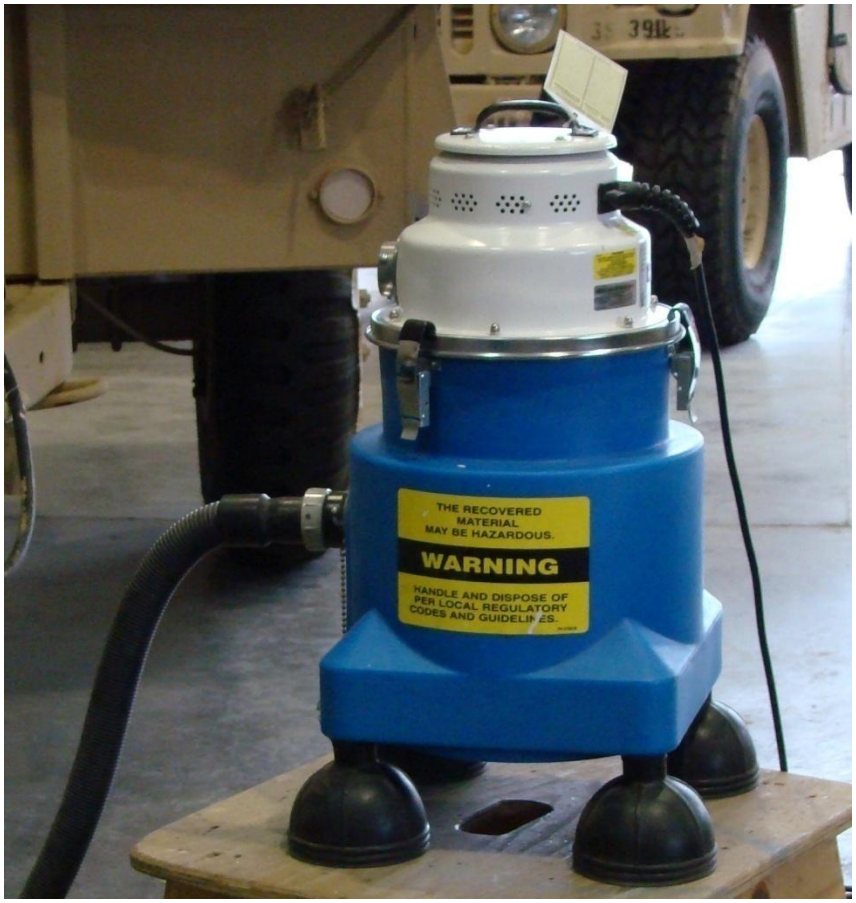
Medium Pressure Water Blast

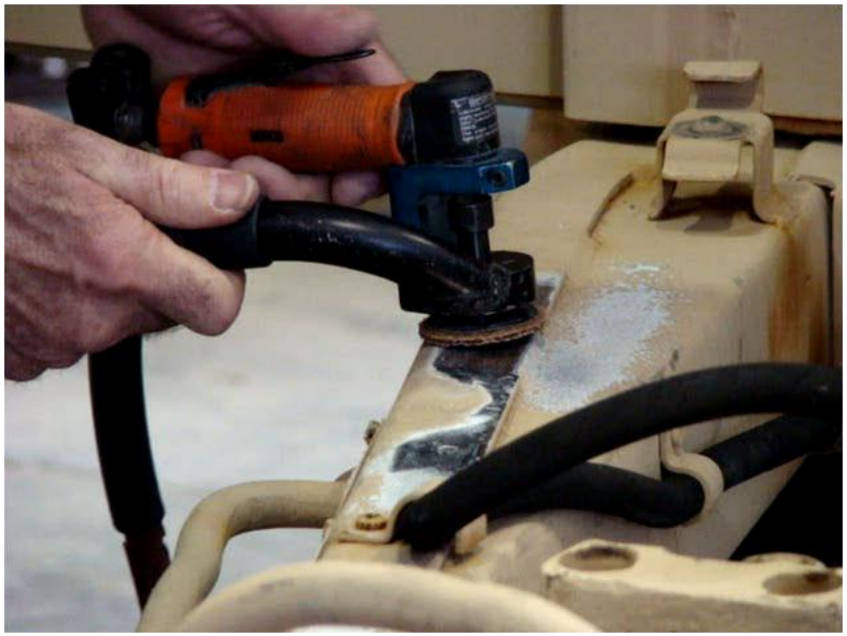






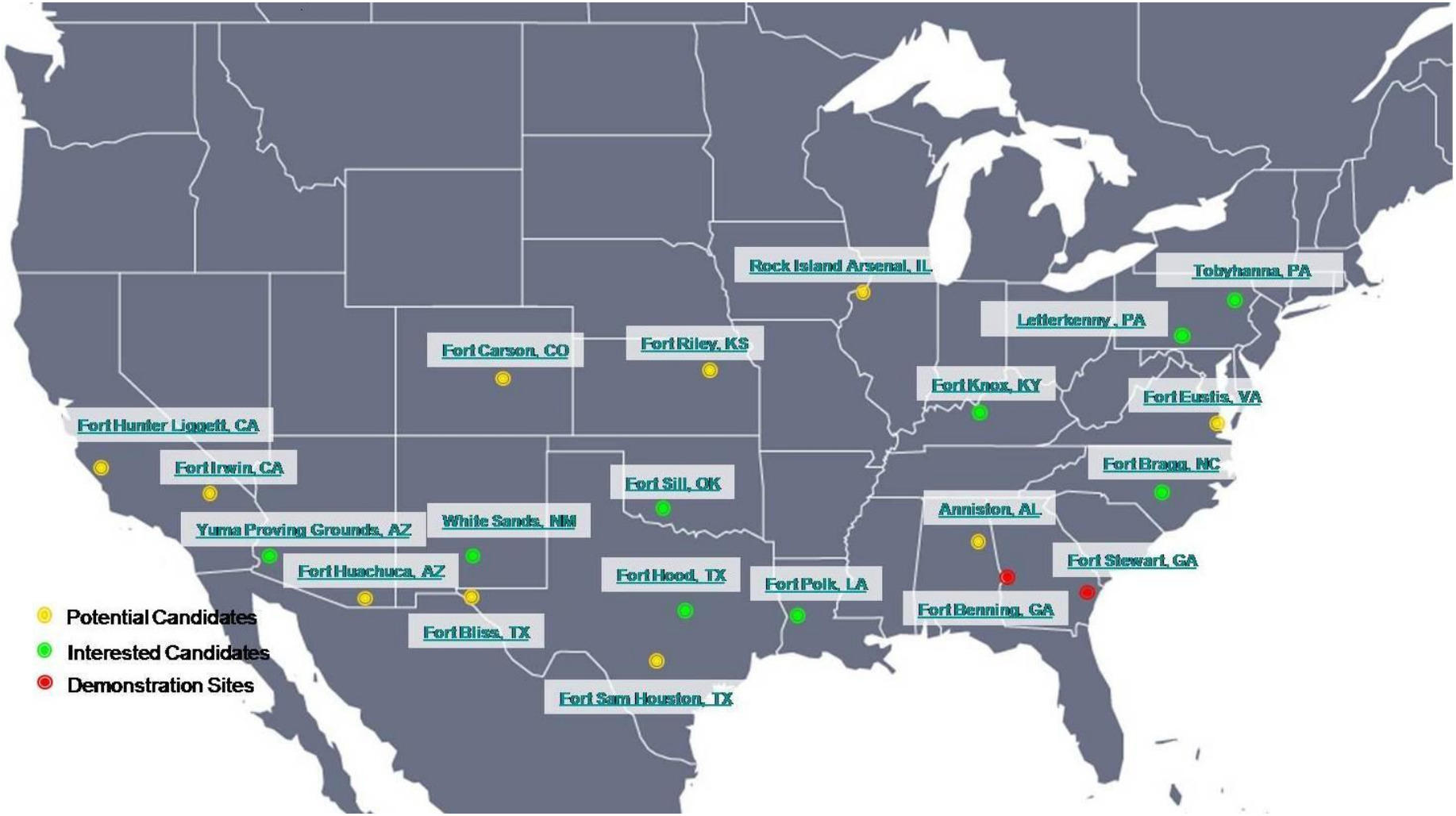
Vacuum Sanding Tools





Demonstrations

Potential Host Sites



Test Plans

- Establish goal and objectives for demonstration
- Identify technologies and training being demonstrated
- Describe planned activities
- Assign roles and responsibilities
  - NDCEE
  - USAEC
  - Host Site
- Coordinate with Stakeholders and address comments

Completed and Planned Demonstrations

- Fort Benning, GA (January 16, 2008)
  - Transitioning to water-dispersible
  - Utilizing hand mixing and HVLP spraying
- Fort Stewart, GA (February 11-14, 2008)
  - Transitioning to water-dispersible
  - Utilizing hand mixing and air assisted airless spraying
- Letterkenny Army Depot, PA (June/July 2008)
- Others (To be determined)

Data Collection

- Baseline information is collected from host sites prior to and during the demonstrations
- Information on technologies, ease of use, and potential improvements is collected during the demonstrations
- Post-demonstration usage data is collected from the host sites over a 6-month period after transition to a new CARC
- Data collected during this task is used to develop site-specific demonstration reports and a business case analysis for Army-wide implementation of the new CARC

Exhibit 1:
MIL-DTL-53039B, Type I, with airless sprayer

LMTV (Light Medium Tactical Vehicle) required 7 gallons of MIL-DTL-53039B, Type I using an airless spray system. One painter needed 15 minutes to finish an entire vehicle. The applied coating had a rough finish, which is representative of the spray system. Dry time in the booth was 1 hour.

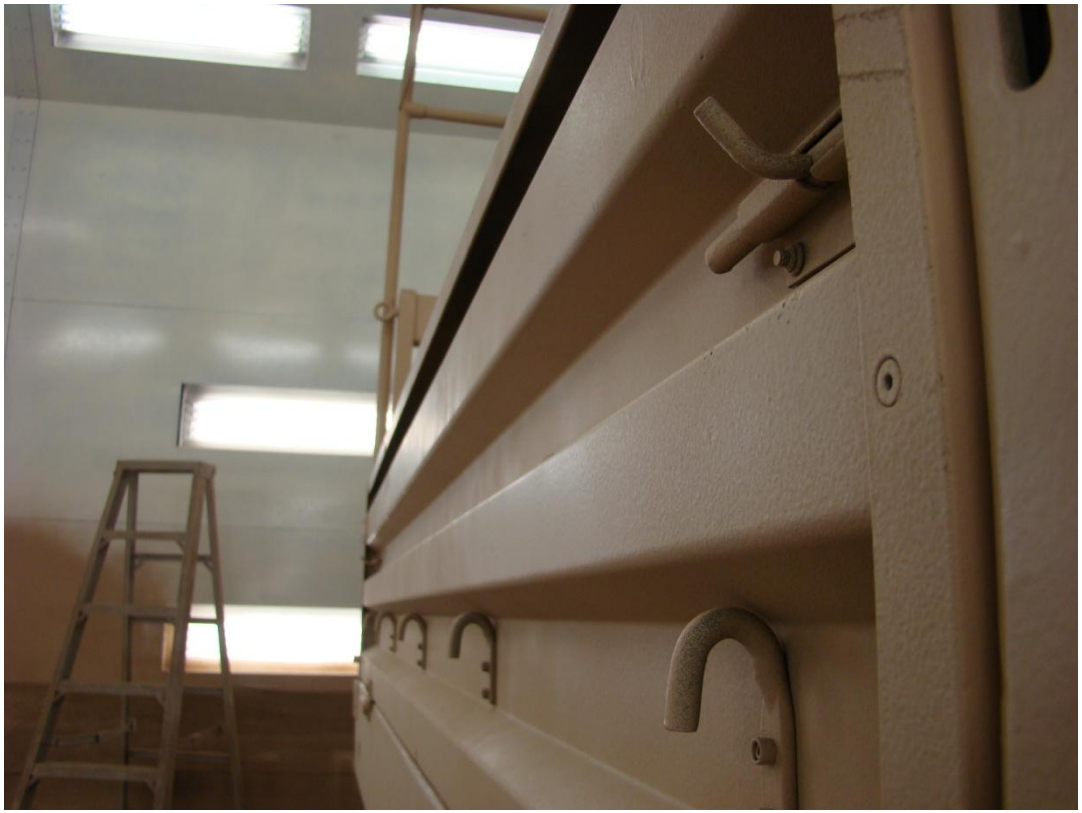


Exhibit 2:
MIL-DTL-64159, Type II, with air-assisted-airless sprayer

LMTV required 3 gallons of MIL-DTL-64159, Type II using an air-assisted-airless spray system. One painter needed about 40 minutes to finish an entire vehicle. The applied coating had a smoother finish than that applied using the airless system. Coating was dry to the touch in 2 hours.

Potential Costs to Implement

- New spray equipment (stainless wetted parts for water dispersible)
  - $500 - $5,000 per system
- Increased coating material costs (may be offset by decreased material usage)
  - 30% or more per gallon
- Improve drying time (ranging from no action to a custom designed drying booth)
  - $0 - >$500,000

Path Forward

- Complete remaining demonstrations
- Collect post-transition data from demonstration host sites
- Compile data and lessons learned into site-specific demonstration reports
- Develop business case analysis for the Army-wide implementation of the low-VOC/zero-HAP CARC for all applications

Summary

- Low-VOC/zero-HAP CARC are being developed to meet future regulatory requirements
- Proper technology selection facilitates the efficient transition to a low-VOC/zero-HAP CARC
- This task is aiding multiple Army sites in the transition to the low-VOC/zero-HAP CARC
- A business case analysis is being developed to accelerate the Army-wide transition to the low-VOC/zero-HAP CARC

Stakeholder Organizations

- Army Environmental Command (USAEC)
- Army Materiel Command (AMC)
- Army National Guard
- Army Office of the Director Environmental Programs (ODEP)
- Army Research Laboratory (ARL)
- Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA-ALT)
- Installation Management Command (IMCOM)

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This work was funded through the Army's Office of the Director of Environmental Programs and conducted under contract W74V8H-04-D-0005 Task 0457.